CLAIMS

What is claimed is:

1. A method comprising:

capturing a primary image with a microlens array at a primary position, the microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property;

determining at least one out-of-focus region of the primary image;

capturing another image with the microlens array at another position;

determining a focus of at least one region of the other image relative to a focus of the at least one out-of-focus region of the primary image; and

constructing a composite image in response to the at least one region of the other image having a sharper focus relative to the focus of the at least one out-of-focus region of the primary image.

2. The method of Claim 1, wherein the microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property further comprises:

the microlens array having at least one microlens position that exceeds a first tolerance from at least one defined microlens position.

3. The method of Claim 1, wherein the microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property further comprises:

a microlens array frame having at least one frame deviation that exceeds a first tolerance from at least one defined array frame position.

4. The method of Claim 1, wherein the microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property further comprises:

at least one microlens having a focal length that exceeds a first tolerance from a defined focal length.

5. The method of Claim 1, wherein the microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property further comprises:

at least one microlens having a spherical aberration that exceeds a first tolerance from a defined spherical aberration.

6. The method of Claim 1, wherein the microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property further comprises:

at least one microlens having a cylindrical aberration that exceeds a first tolerance from a defined cylindrical aberration.

7. The method of Claim 1, wherein said capturing a primary image with a microlens array at a primary position, the microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property further comprises:

capturing the primary image at a primary focal surface location of the microlens array.

8. The method of Claim 7, wherein said capturing the primary image at a primary focal surface location of the microlens array further comprises:

capturing the primary image with a photo-detector array at the primary focal surface location of the microlens array.

9. The method of Claim 1, wherein said capturing another image with the microlens array at another position further comprises:

capturing the other image at a primary focal surface location of the microlens array at the primary position.

10. The method of Claim 9, wherein said capturing the other image at a primary focal surface location of the microlens array at the primary position further comprises:

moving at least a part of the microlens array to the other position;

capturing the other image with a photo-detector array at the average primary focal surface location of the microlens array at the average primary position.

11. The method of Claim 10, wherein said moving at least a part of the microlens array to the other position further comprises:

moving the at least a part of the microlens array to the other position, said moving constrained by a predefined variation from at least one defined microlens position.

12. The method of Claim 10, wherein said moving at least a part of the microlens array to the other position further comprises:

moving an intermediary lens.

13. The method of Claim 10, wherein said moving at least a part of the microlens array to the other position further comprises:

distorting the microlens array such that the at least a part of the microlens array resides at the other position.

14. The method of Claim 1, wherein said determining at least one out-of-focus region of the primary image further comprises:

calculating a Fourier transform of at least a part of the primary image.

15. The method of Claim 14, wherein said calculating a Fourier transform of at least a part of the primary image further comprises:

calculating a Fourier transform of at least one region of the primary image associated with at least one microlens.

16. The method of Claim 1, wherein said determining a focus of at least one region of the other image relative to a focus of the at least one out-of-focus region of the primary image further comprises:

calculating a Fourier transform of at least a part of the at least one region of the other image.

17. The method of Claim 16, wherein said calculating a Fourier transform of at least a part of the at least one region of the other further comprises:

mapping at least one region of the primary image with the at least one region of the other image.

18. The method of Claim 16, wherein said calculating a Fourier transform of at least a part of the at least one region of the other further comprises:

mapping at least one region of the primary image associated with at least one specific microlens against the at least one region of the other image associated with the at least one specific microlens.

19. The method of Claim 1, wherein said constructing a composite image in response to the at least one region of the other image having a sharper focus relative to the focus of the at least one out-of-focus region of the primary image further comprises:

replacing at least a part of the out-of-focus region of the primary image with at least a part of the at least one region of the other image.

20. The method of Claim 19, wherein said replacing at least a part of the out-of-focus region of the primary image with at least a part of the at least one region of the other image further comprises:

utilizing at least one of tiling image processing techniques, morphing image processing techniques, blending image processing techniques, and stitching image processing techniques.

21. The method of Claim 1, wherein said constructing a composite image in response to the at least one region of the other image having a sharper focus relative to the focus of the at least one out-of-focus region of the primary image further comprises:

correlating a feature of the primary image with a feature of the other image;

detecting at least one of size, color, and displacement distortion of at least one of the primary image and the other image;

correcting the detected at least one of size, color, and displacement distortion of the at least one of the primary image and the other image; and

assembling the composite image using the corrected distortion.

22. The method of Claim 1, further comprising:

correcting for motion between the primary and the other image.

23. A system comprising:

a microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property;

means for capturing a primary image with a lens at a primary position;

means for determining at least one out-of-focus region of the primary image;

means for capturing another image with the lens at another position;

means for determining a focus of at least one region of the other image relative to a focus of the at least one out-of-focus region of the primary image; and

means for constructing a composite image in response to the at least one region of the other image having a sharper focus relative to the focus of the at least one out-of-focus region of the primary image.

24. The system of Claim 23, wherein said microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property further comprises:

the microlens array having at least one microlens position that exceeds a first tolerance from at least one defined microlens position.

25. The system of Claim 23, wherein said microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property further comprises:

a microlens array frame having at least one frame deviation that exceeds a first tolerance from at least one defined array frame position.

26. The system of Claim 23, wherein said microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property further comprises:

at least one microlens having a focal length that exceeds a first tolerance from a defined focal length.

27. The system of Claim 23, wherein said microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property further comprises:

at least one microlens having a spherical aberration that exceeds a first tolerance from a defined spherical aberration.

28. The system of Claim 23, wherein said microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property further comprises:

at least one microlens having a cylindrical aberration that exceeds a first tolerance from a defined cylindrical aberration.

29. The system of Claim 23, wherein said means for capturing a primary image with a lens at a primary position further comprises:

means for capturing the primary image at a primary focal surface location of the microlens array.

30. The system of Claim 29, wherein said means for capturing the primary image at a primary focal surface location of the microlens array further comprises:

means for capturing the primary image with a photo-detector array at the primary focal surface location of the microlens array.

31. The system of Claim 23, wherein said means for capturing another image with the lens at another position further comprises:

means for capturing the other image at a primary focal surface location of the microlens array at the primary position.

32. The system of Claim 31, wherein said means for capturing the other image at a primary focal surface location of the microlens array at the primary position further comprises:

means for moving at least a part of the microlens array to the other position; and

means for capturing the other image with a photo-detector array at the average primary focal surface location of the microlens array at the average primary position.

33. The system of Claim 32, wherein said means for moving at least a part of the microlens array to the other position further comprises:

means for moving the at least a part of the lens to the other position within at least one distance constrained by a predefined variation from at least one defined microlens position.

34. The system of Claim 32, wherein said means for moving at least a part of the microlens array to the other position further comprises:

means for moving an intermediary lens.

35. The system of Claim 32, wherein said means for moving at least a part of the microlens array to the other position further comprises:

means for distorting the microlens array such that the at least a part of the microlens array resides at the other position.

36. The system of Claim 23, wherein said means for determining at least one out-of-focus region of the primary image further comprises:

means for calculating a Fourier transform of at least a part of the primary image.

37. The system of Claim 36, wherein said means for calculating a Fourier transform of at least a part of the primary image further comprises:

means for calculating a Fourier transform of at least one region of the primary image associated with at least one microlens.

38. The system of Claim 23, wherein said means for determining a focus of at least one region of the other image relative to a focus of the at least one out-of-focus region of the primary image further comprises:

means for calculating a Fourier transform of at least a part of the at least one region of the other image.

39. The system of Claim 38, wherein said means for calculating a Fourier transform of at least a part of the at least one region of the other image further comprises:

means for mapping at least one region of the primary image with at least one region of the other image.

40. The system of Claim 38, wherein said calculating a Fourier transform of at least a part of the at least one region of the other further comprises:

means for mapping at least one region of the primary image associated with at least one specific microlens against the at least one region of the other image associated with the at least one specific microlens.

41. The system of Claim 23, wherein said means for constructing a composite image in response to the at least one region of the other image having a sharper focus relative to the focus of the at least one out-of-focus region of the primary image further comprises:

means for replacing at least a part of the out-of-focus region of the primary image with at least a part of the at least one region of the other image.

42. The system of Claim 41, wherein said means for replacing at least a part of the out-of-focus region of the primary image with at least a part of the at least one region of the other image further comprises:

means for utilizing at least one of tiling image processing techniques, morphing image processing techniques, blending image processing techniques, and stitching image processing techniques.

43. The system of Claim 23, wherein said means for constructing a composite image in response to the at least one region of the other image having a sharper focus relative to the focus of the at least one out-of-focus region of the primary image further comprises:

means for correlating a feature of the primary image with a feature of the other image;

means for detecting at least one of size, color, and displacement distortion of at least one of the primary image and the other image;

means for correcting the detected at least one of size, color, and displacement distortion of the at least one of the primary image and the other image; and

means for assembling the composite image using the corrected distortion.

44. The system of Claim 23, wherein said means for constructing a composite image in response to the at least one region of the other image having a sharper focus relative to the focus of the at least one out-of-focus region of the primary image further comprises:

means for correcting for motion between the primary and the other image.

45. A system comprising:

a photo-detector array;

a microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property;

a controller configured to position said microlens array at a primary and another position relative to said photo-detector array and to cause an image capture signal at the primary and the other position; and

an image construction unit configured to construct at least one out-of-focus region of a first image captured at the primary position with a more in-focus region of another image captured at the other position.

46. The system of Claim 45, wherein said controller configured to position said microlens array at a primary and another position relative to said photo-detector array and to cause an image capture signal at the primary and the other position further comprises:

a transducer system having a control signal input operably coupled with said controller and a motion output operably coupled with said microlens array.

47. The system of Claim 46, wherein said transducer system further comprises an electric motor operably coupled to move said microlens array

48. The system of Claim 46, wherein said transducer system further comprises an electric motor operably coupled to distort said microlens array

49. The system of Claim 45, wherein said image construction unit configured to construct at least one out-of-focus region of a first image captured at the primary position

with a more in-focus region of another image captured at the other position further comprises:

circuitry for constructing at least one out-of-focus region of a first image captured at the primary position with a more in-focus region of another image captured at the other position said circuitry including at least one of electrical circuitry having at least one discrete electrical circuit, electrical circuitry having at least one integrated circuit, electrical circuitry having at least one application specific integrated circuit, electrical circuitry having a general purpose computing device configured by a computer program, electrical circuitry having a memory device, and electrical circuitry having a communications device.

50. A system comprising:

a microlens array having at least one microlens deviation that exceeds a first tolerance from a target optical property;

an electro-mechanical system configurable to capture a primary image with the microlens array at a primary position said electro-mechanical system including at least one of electrical circuitry operably coupled with a transducer, electrical circuitry having at least one discrete electrical circuit, electrical circuitry having at least one integrated circuit, electrical circuitry having at least one application specific integrated circuit, electrical circuitry having a general purpose computing device configured by a computer program, electrical circuitry having a memory device, and electrical circuitry having a communications device;

an electro-mechanical system configurable to capture another image with the microlens array at another position said electro-mechanical system including at least one of electrical circuitry operably coupled with a transducer, electrical circuitry having at least one discrete electrical circuit, electrical circuitry having at least one integrated circuit, electrical circuitry having at least one application specific integrated circuit, electrical circuitry having a general purpose computing device configured by a computer program, electrical circuitry having a memory device, and electrical circuitry having a communications device;

an electro-mechanical system configurable to determine at least one out-of-focus region of the primary image said electro-mechanical system including at least one of electrical circuitry operably coupled with a transducer, electrical circuitry having at least one discrete electrical circuit, electrical circuitry having at least one integrated circuit, electrical circuitry having at least one application specific integrated circuit, electrical circuitry having a general purpose computing device configured by a computer program, electrical circuitry having a memory device, and electrical circuitry having a communications device;

an electro-mechanical system configurable to determine a focus of at least one region of the other image relative to a focus of the at least one out-of-focus region of the primary image said electro-mechanical system including at least one of electrical circuitry operably coupled with a transducer, electrical circuitry having at least one discrete electrical circuit, electrical circuitry having at least one integrated circuit, electrical circuitry having at least one application specific integrated circuit, electrical circuitry having a general purpose computing device configured by a computer program, electrical circuitry having a memory device, and electrical circuitry having a communications device;

an electro-mechanical system configurable to determine a focus of at least one region of the other image relative to a focus of the at least one out-of-focus region of the primary image said electro-mechanical system including at least one of electrical circuitry operably coupled with a transducer, electrical circuitry having at least one discrete electrical circuit, electrical circuitry having at least one integrated circuit, electrical circuitry having at least one application specific integrated circuit, electrical circuitry having a general purpose computing device configured by a computer program, electrical circuitry having a memory device, and electrical circuitry having a communications device; and

an electro-mechanical system configurable to construct a composite image in response to the at least one region of the other image having a sharper focus relative to the focus of the at least one out-of-focus region of the primary image said electro-mechanical system including at least one of electrical circuitry operably coupled with a transducer, electrical circuitry having at least one discrete electrical circuit, electrical circuitry having at least one integrated circuit, electrical circuitry having at least one application specific integrated circuit, electrical circuitry having a general purpose computing device configured by a computer program, electrical circuitry having a memory device, and electrical circuitry having a communications device.

51. A method comprising:

capturing a primary image with a microlens array at a primary position, said capturing effected with a photo-detector array having an imaging surface deviation that exceeds a first tolerance from a target surface position;

determining at least one out-of-focus region of the primary image;

capturing another image with the microlens array at another position;

determining a focus of at least one region of the other image relative to a focus of the at least one out-of-focus region of the primary image; and

constructing a composite image in response to the at least one region of the other image having a sharper focus relative to the focus of the at least one out-of-focus region of the primary image.

52. The method of Claim 51, wherein said capturing effected with a photo-detector array having an imaging surface deviation that exceeds a first tolerance from a target surface position further comprises:

the photo-detector array having at least one photo-detector position that exceeds a first tolerance from at least one defined photo-detector position.